able time to produce disease, except in the case of small infants. In the last war most of the nutritional diseases were caused by lack of food in quantity, and the starving children of Europe would improve almost immediately if given in sufficient amount almost any kind of a single whole grain cereal. In voicing an optimistic note, we should not lose sight of the possibility of contaminated or spoiled foods, and the dangers of botulism, infectious enteritis, or abortus fever. A word should be said for the encouragement of breast feeding for small infants during wartime, especially if danger of evacuation or isolation be imminent. The importance of good nutrition in combating the first group mentioned, the infectious diseases, should be emphasized again.

PSYCHIATRIC DISTURBANCES

These are common among children in wartime, even when far removed from combat zones. Air-raid practice among school children without proper psychic preparation, careless talk from elders, present day radio and cinema entertainment may strike terror into the heart of a child. While discussions and decisions in this field lie properly among the child psychiatrists, all medical people are asked by mothers: What and how much shall I tell my child? While there are many who hold to the view that they should be told all, this point is surely debatable, and might we offer the suggestion that they should be told only when they ask? Is it not true that as nobody knows the answers, the longer the telling be postponed, the more it may become unnecessary to tell them at all? This, of course, is dependent on the maturity of the child, and within reason of safety to themselves. Morbid discussion, and display of fear should at all times be taboo. School and recreational facilities for the child should not be curtailed, and even in times of all-out production, the home life, his anchor to reality, should be as little disturbed as possible. During actual disaster, from English experience, it is known that children stand up in direct proportion to their elders, but we must also remember that in time of actual battle, children are more apt to become casualties without being injured. They may become lost, and injured and ill through wandering, after the battle is over.

RELATION TO NATIONAL DEFENSE

Is there any way in which we may aid in National Offense? In the number of selectees rejected for military service, the reasons for rejection have been largely: first, for faulty dentition, and second, defective vision. In many it was found that there had been evidence of these same deficiencies fifteen years previously. These defects, with others, such as cardiovascular and ear diseases, make up a relatively large group, remedial in part in early life if found by the physician. It is more than possible, and God forbid, that older children now under our medical supervision may see service in the present war. We might conceivably add to the available manpower later by being on the alert now.

SUMMARY

The duty of the physician toward the child in wartime can be summarized briefly. It is to meet the increased hazards of physical and mental disease by not only doing our present job, but to intensify our work of education and prevention in all its phases. Never before in the world's history have children been cared for so well. It would still be a tragedy to win a military victory and find our children's standard of health lower than when we were attacked.

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CHEST X-RAY EXAMINATIONS OF LARGE GROUPS*

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BY general agreement radiographic examination of the chest is usually considered the most trustworthy procedure. Such surveys of large groups of individuals are becoming popular, and may be expected to become even more frequent even after the Army mobilization is over. These surveys made on large groups are really the cheapest possible form of insurance, for by this means cases of early or even advanced tuberculosis are discovered which might otherwise be inducted into the Army or employed by industry. Spillman has estimated that tuberculosis during and after the World War has cost approximately $960,000,000 to date in compensation, vocation training, insurance, hospitalization. Within the next five years these costs will pass the billion dollar mark.[1] The importance of selecting men without disease of the lungs, therefore, can be easily seen. In other words, each case of pulmonary tuberculosis in a soldier who was in the last war has cost the Government an average of $15,531 to date,[2] and the end is not yet in sight. In comparison to such large expenditures, the cost of an x-ray examination is negligible. Ordinarily the cost of x-ray film amounts to only about 20 per cent of the x-ray examination. This figure is not correct, however, when large groups of individuals are examined at one time, for under these circumstances the proportionate cost attributable to film rises considerably. For this reason many compromises have been made recently using films of 4 x 5 inches (or 4 x 10 stereoscopic), as well as 35 mm. film. Under these circumstances the fluoroscopic screen has been photographed in order to obtain a reduced image. Film substitutes such as paper have also been employed.

The impression has sometimes been given that satisfactory results and rapid speed of examina-

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* Chairman's address. Read before the Section on Radiology, at the Seventy-first Annual Session of the California Medical Association, Del Monte, May 3-6, 1942.

tion cannot be attained with the standard 14 x 17 size of films.[3] This is by no means the case. In our experience the largest part of the time required in any method is consumed getting the patient into the proper position. Since this is the case, standard 14 x 17 radiographs can be produced, therefore, as rapidly as any of the substandard film sizes, or even photographic paper in rolls.

PROCEDURE

It must be remembered primarily that greater degrees of speed and efficiency can be obtained when the patients consist solely of coöperative young men, such as Army inductees, than could possibly be reached with mixed groups of individuals. Work can be arranged in a "production line" so that all of the technicians and assistants have relatively simple jobs with which they soon become familiar. Because the human element is involved, the work cannot be made to proceed entirely with mechanical efficiency, but speeds of 100 examinations an hour may become routine, although more than 125 an hour have been attained when medical students were examined, because of the intelligent coöperation of such a group.

The technique with 4 x 5 and 4 x 10 films does not differ greatly than when films of 14 x 17 size are used. Target film distance is decreased—a compromise necessitated by the immense x-ray output required with present photoroentgen equipment. For the same reason kilovoltages are increased so that the working range falls between 70 and 95, while the milliampere second output must rise to 40 or 60 milliampere seconds or even more.

The compromises necessitated by the requirements of the present-day photoroentgen units might be expected to produce films of inferior contrast and detail, and, as a matter of fact, they do. High kilovoltages, target-screen distances of 36 to 40 inches, screen grain and coarse focal spots all go to produce poorer detail in the image, while contrast is often objectionably marked. It is to be hoped that contrast will be lessened and detail improved when the single-coated 4 x 10 film comes into general use for photoroentgen work, rather than the duplitized film which is generally being supplied at present. The image on the back surface of the duplitized film is so faint that it serves largely to blur the light transmitted through the film instead of improving the sharpness of the image.

ON ACCURACY OF DIAGNOSIS: SOME COMPARISONS

Whether the inferior quality of the image made with the photoroentgen equipment would affect the accuracy of diagnosis markedly, could be determined by comparing large groups of single 14 x 17 chest films with 4 x 10 stereo chest films. Such a comparison is made below on groups of the same type of inductees with both sizes of films.

13,494 cases were examined on single 14 x 17 films. The findings were as follows:

	Number	*Percentage*
Group No. 1—Small calcifications (juvenile type)	882	6.5
Group No. 2—Excessive calcifications (juvenile)*	216	1.6
Group No. 3—Active pulmonary tuberculosis	144	1.1

In contrast is a group of 20,629 cases with stereoscopic examinations on 4 x 10 films which showed:

Group No. 1—Small calcifications (juvenile type)	886	4.2
Group No. 2—Excessive calcifications (juvenile)*	182	0.88
Group No. 3—Active pulmonary tuberculosis	274	1.32

A considerable decrease in the number of cases with calcifications appears in the studies made with 4 x 10 films. This is partly to be explained by the fact that the contrast is so marked in the photoroentgen films that soft-tissue shadows—especially in the hilar regions—have almost the same density as calcifications. The latter are, therefore, not indentifiable.

It was surprising to me that the rejections for active tuberculosis of the type in which actual parenchymal infiltration was present, Group No. 3, were as high (or even higher), with the small films as with the large ones. This can perhaps partly be explained by the magnification of small lesions which is apt to occur because of the short target film distance. It must be admitted, therefore, that even though these small films are lacking in many desirable diagnostic qualities, they do, nevertheless, serve as a relatively satisfactory screening method for mass examinations of the chest.

Of the cases of tuberculosis in both series, 47 per cent were classified as "minimal," 42 per cent were considered "moderately advanced," and 10 per cent were diagnosed "far advanced." Whether the inductees had had physical examinations of the chest made previously to x-ray studies or not, did not appreciably affect these percentages of tuberculosis discovered by x-ray.

A further disadvantage of the use of small films is to be found in the relatively long exposures which are now necessary. As a result, motion of the basal trunks often occurs, and it is, therefore, difficult to predict from the small films whether an increase in these trunk shadows is present or not. Similarly the cardiac shadow itself, because of the 36 to 40 inch screen-target distance, may appear to be enlarged, when actually this is not the case.

* Calcifications of the juvenile type, Group No. 2, were rejected according to the standards proposed by the Army Medical School,[4] i.e.:

1. Parenchymal nodulations—multiple—more than 10 in number or if the diameter of any one be greater than 1.0 cm. or if more than one be larger than 0.5 cm.

2. Lymph node densities—multiple—more than 5 in number or if the diameter of any one be greater than 1.5 cm.

CONCLUSIONS

1. The detail in 4 x 10 films is considerably less than the best attainable on 14 x 17 films, and little can be said about heart size because of the short target-screen distance. The films are, nevertheless, more satisfactory than might be expected for the purpose of finding active tuberculosis in mass examinations.

2. In the accompanying tables a large number of cases which were examined with single 14 x 17 film are compared with groups of similar individuals examined stereoscopically with 4 x 10 film in the photoroentgen unit. The percentage of active cases of tuberculosis discovered was a little higher with the stereoscopic 4 x 10 films.

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WAR SOFT TISSUE WOUNDS AND THEIR COMPLICATIONS*

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SOFT tissue wounds obtained under war conditions differ from those of peacetime accidental nature and, primarily so, because of the effect from the greater causative tearing and contusing force. As a result of this, a more widely distributed tissue injury occurs and demands a more complete, and to the uninitiated a far more radical, surgical treatment than employed in the correction of the usual peacetime traumatic wound.

War-wounds have with each succeeding war been caused in increasing number by high explosives, missiles with more irregular form and with relatively slower speed; and in this present world war to a greater extent by secondary objects, as broken glass, wood, masonry, etc. All of this leads to greater traumatism, and increasing incidences of the two great complications of wounds, hemorrhage and infection.

From the past wars we learned, but did not always profit as we should from recorded experiences. Ambroise Paré taught that the wounds be left undisturbed: "I dressed it, and God healed it." John Hunter, in his treatise on "Gunshot Wounds," in 1761, remarked: "A part of the solids surrounding the wound is deadened and is afterwards thrown off as a slough." Larrey, Napoleon's great medical Director-General, who developed the plan on which all modern military medical care is based, in 1797, emphasized the value of treatment at the earliest possible moment. We learned, therefore, from Paré the healing process of physiology; from Hunter the nature of the injury; and from Larrey the importance of time. In the last great war, the lessons learned were the rôle of devitalized tissue, the value of early wound excision and, to some extent, the importance of immobilization.

WOUNDS[1-5]

The nature of the soft tissue wound is ragged in outline and follows an irregular course through or into the tissues. Since tissues vary in their structures, i.e., the strong continuity of the skin, the elasticity of the blood vessel walls, the cellular friability of muscle and the rigidity of bone, the damage done varies with the tissues struck. The skin tears, the blood vessel wall flexes to one side, the muscle ruptures and has a comparatively wider area of tissue destruction, and the bone shatters, giving a secondary larger explosive effect. Since the missile causing the wound is, as a rule, of blunt irregular type, and is traveling at a comparatively slow rate of speed, a contusing injury from the blast force occurs along all sides of the wound, resulting in a varying devitalization of neighborhood tissues. In addition the irregular-shaped missile, be it primary or secondary, is prone to carry in with it pieces of clothing or other worn objects, and dirt or the local terrain. These factors, therefore, lead to an irregular shaped wound, of irregular course through the tissues, a devitalization of neighborhood tissue and a bacterial contamination of the injured tissues.

WOUND CONTAMINATION AND INFECTION

The soiling of all wounds under war conditions forces us to consider wounds in their two main stages, that of contamination and that of infection. Contamination is that stage where the bacteria are upon the surface and not as yet proliferative; whereas infection is the stage where the bacteria have invaded the tissues and proliferation is occuring.

The stage of contamination may exist up to twelve hours, but preferably should be considered up to six or eight hours. The degree of contamination varies, dependent upon the terrain, a heavily-cultivated soil or a sandy desert; the condition of the weather giving a dry warm dust or a muddy contamination of objects and clothing; the portion of the body involved, for example, the clostridia are more common about the lower extremities, especially the thighs; and the type and cleanliness of the clothing worn and the cleanliness of the individual, for example, the clostridia are found in a high percentage of instances to be present in woolen garments, and recent bathing gives less infection, as was well illustrated in the Russo-Japanese War.

The stage of infection or invasion of the tissues follows that of contamination. It is dependent upon the pathogenicity and virulence of the in-

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